Revised September 27, 2004

AASHTO T19-00
BULK DENSITY ("UNIT WEIGHT")
& VOIDS IN AGGREGATE

APPARATUS				
1. Unit Weight Measures	1	2	3	4
Capacity? – Record 2.8, 9.3, 14, 28, 70 or 100 L (1/10, 1/3, ½, 1, 2 ½, or 3 ½ ft^3)*				
Diameter? (Record)				
Height is 80 – 150% of diameter? (Record height)				
Top rim is smooth and watertight?				
Top rim is plane to 0.25 mm (0.01 in)?				
Interior wall of measure a smooth and continuous surface?				
Capacity less than 11 L (0.4 ft^3): Min. thickness of bottom = 5.0 mm (0.20 in)?				
Min. thick. of top 38 mm of wall = 2.5 mm (0.10 in)?				
Min. thick. of remainder of wall = 2.5 mm (0.10 in)?				
Capacity 11 to 42 L (0.4 to 1.5 ft^3): Min. thickness of bottom = 5.0 mm (0.20 in)?				
Min. thick. of top 38 mm of wall = 5.0 mm (0.20 in)?				
Min. thick. of remainder of wall = 3.0 mm (0.12 in)?				
Capacity >42 to 80 L (1.5 to 2.8 ft^3): Min. thickness of bottom = 10.0 mm (0.40 in)?				
Min. thick. of top 38 mm of wall = 6.4 mm (0.25 in)?				
Min. thick. of remainder of wall = 3.8 mm (0.15 in)?				
Capacity >80 to 133 L (2.8 to 4.0 ft^3): Min. thickness of bottom = 13.0 mm (0.50 in)?				
Min. thick. of top 38 mm of wall = 7.6 mm (0.30 in)?				
Min. thick. of remainder of wall = 5.0 mm (0.20 in)?				
Reported calibration factor or volume? (Record)				

***** The actual volume of measure shall be at least 95% of the nominal volume.

$VOLUME = 3.142\ d^2h/4$

$1\ L = 0.001\ m^3$

	Test 1	**Test 2**
2. Tamping rod: (a) Round, straight steel rod? (b) 16 mm (5/8 in.) in diameter? (c) Approximately 600 mm (24 in.) long? (d) 16 mm (5/8 in.) hemispherical tip?		
3. Shovel or scoop?		
4. Calibration equipment: (a) Piece of plate glass (larger than the measure's diameter)? (b) Chassis or water pump grease?		
5. Balance: (a) Graduated to at least 0.05 kg (0.1 lb) increments? (b) AASHTO: Readable to 0.1% of sample mass? ***ASTM: Accurate to 0.1% of test load?***		

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PROCEDURE

Student will demonstrate Rodding procedure and list the other two methods for proctor.	**Test 1**	**Test 2**
1. Sample obtained by T248 ***(ASTM C702)****?*		
2. Sample size approximately 125 to 200 percent of the quantity needed to fill the measure?		
3. Sample dried to essentially constant mass or at 110±5°C (230±9°F)?		
4. Measure used conforms to the following table?		

Nominal Maximum Size	Minimum Capacity of Measure, L (ft^3) [m^3]
12.5 mm (1/2 in)	2.8 L (1/10) [0.0028]
25.0 mm (1 in)	9.3 L (1/3) [0.0093]
37.5 mm (1 ½ in)	14 L (1/2) [0.014]
75 mm (3 in)	28 L (1) [0.028]
112 mm (4 ½ in) *ASTM: 100mm (4 in)*	70 L (2 ½) [0.070]
150 mm (6 in) *ASTM: 125 mm (5 in)*	100 L (3 ½) [0.100]

Rodding procedure (up to 37.5-mm [1 ½-in.] particles):	**Test 1**	**Test 2**
1. Measure filled 1/3 full and leveled with fingers?		
2. Aggregate rodded with 25 evenly distributed tamping strokes?		
3. Tamping rod does not forcibly strike the bottom of the measure?		
4. Measure filled with two more similar layers?		
5. Tamping strokes limited to layer being tamped?		
6. Third layer filled to overflowing (before tamping)?		
7. Surface leveled with the fingers or the straightedge (tamping rod)?		
8. Average level surface obtained (aggregate projections above the rim balance the voids below the rim)?		
9. Net mass determined to the nearest 0.05 kg (0.1 lb)?		
10. Net mass of aggregate multiplied by calibration factor or divided by volume of the measure?		
11. Bulk density reported to the nearest 10 kg/m^3 (1 lb/ft^3)?		
12. Void content (if determined) reported to the nearest 1 percent?		
13. **Jigging procedure** (37.5 to 150-mm [1 ½ to 6-in.] particles):		
14. **Shoveling procedure** (up to 150-mm [6-in.] particles): Note: This method only used when specified.		

Date Tested: _____ **Person Assessed:** _____ **Assessor:** _____

Retest Date: _____ **Assessor:** _____